

Invited Editorial / Davetli Editöryal Yorum

Is glomerular filtration rate a marker of severity of coronary heart disease?

Glomerüler filtrasyon hızı koroner kalp hastalığı şiddetinin bir belirteci midir?

Tevfik Ecdar, M.D.

Department of Internal Medicine, Division of Nephrology, İstanbul Bilim University Faculty of Medicine, İstanbul, Turkey

Cardiovascular disease is the leading cause of morbidity and mortality in patients with chronic kidney disease (CKD).^[1,2] CKD is associated with increased prevalence of concomitant congestive heart failure, coronary heart disease (CHD), cardiac arrhythmias, valvular calcification, cerebrovascular disease, stroke, and peripheral vascular disease.^[3] Increased risk of cardiovascular events in these patients is related to traditional and nontraditional risk factors.^[4-6] Traditional risk factors such as diabetes mellitus, hypertension, and dyslipidemia are more prevalent in patients with CKD than in the general population.^[5-7] Moreover, nontraditional risk factors for cardiovascular disease, including albuminuria, anemia, hyperphosphatemia, oxidative stress, and inflammation, are common in patients with CKD.^[6] Therefore, CKD is accepted as a risk factor for the development and progression of cardiovascular disease.^[8] The American Heart Association advises that all patients with cardiovascular disease be screened for evidence of kidney disease by calculating glomerular filtration rate (GFR) and detecting microalbuminuria.^[8]

CKD is associated with accelerated cardiovascular disease, even when kidney function is only mildly decreased. Several studies have shown that mild-to-moderate elevations in serum creatinine levels independently increase risk of cardiovascular morbidity

and mortality.^[9-11] Go et al.^[9] reported that among 1,120,295 adults within a large, integrated system of health care delivery, a reduced estimated GFR was associated with increased risk of death, cardiovascular events, and hospitalization, independent of known risk factors, history of cardiovascular disease, and presence of documented proteinuria. Likewise, Anavekar et al.^[11] found that even a mild decrease in GFR is an independent and easily identifiable risk factor for cardiovascular complications among patients who have had myocardial infarction. Furthermore, patients with CKD have higher risk of morbidity and mortality following coronary revascularization procedures, compared to patients with normal renal function.^[12-14]

In this issue of the Archives of the Turkish Society of Cardiology, Ekici et al.^[15] investigated the effects of GFR on the severity of CHD. The authors included 918 patients who had undergone coronary angiography due to positive noninvasive stress test. The extent and severity of CHD were evaluated according to SYNTAX score, and GFR was calculated using the simplified modification of diet in renal disease equation. A negative, statistically significant correlation was determined between SYNTAX score and GFR.

Abbreviations:

CHD Coronary heart disease
CKD Chronic kidney disease
GFR Glomerular filtration rate

Correspondence: Dr. Tevfik Ecdar, İstanbul Bilim Üniversitesi Tıp Fakültesi, İç Hastalıkları Anabilim Dalı, İstanbul, Turkey.

Tel: +90 212 - 219 45 53 e-mail: ecdar@istanbul.edu.tr

© 2016 Turkish Society of Cardiology



In a previous study that included 411 patients with stable coronary artery disease, Uçar et al.^[16] similarly reported that patients with GFR <90 ml/min/1.73 m² had significantly higher SYNTAX scores than patients with GFR ≥90 ml/min/1.73 m². The Ekici et al.^[15] study, which included a larger patient population, confirmed this finding. Moreover, a novel finding in this study is that patients with lower GFRs were more likely to undergo percutaneous coronary intervention and coronary artery bypass graft, compared to patients with higher GFRs, who were more likely to continue with medical therapy.

In conclusion, there is growing evidence in epidemiological and clinical studies that decreased GFR is an independent risk factor for cardiovascular morbidity and mortality, both in patients with CKD and in patients with CHD. GFR can be easily calculated in order to predict patient risk. Can GFR be used as a marker of severity of coronary artery disease? The study by Ekici et al.^[15] provides this evidence. More studies may support this approach in the future.

Conflict-of-interest issues regarding the authorship or article: None declared.

REFERENCES

- Weiner DE, Tighiouart H, Amin MG, Stark PC, MacLeod B, Griffith JL, et al. Chronic kidney disease as a risk factor for cardiovascular disease and all-cause mortality: a pooled analysis of community-based studies. *J Am Soc Nephrol* 2004;15:1307–15. [CrossRef](#)
- Tonelli M, Wiebe N, Cullerton B, House A, Rabbat C, Fok M, et al. Chronic kidney disease and mortality risk: a systematic review. *J Am Soc Nephrol* 2006;17:2034–47. [CrossRef](#)
- Herzog CA, Asinger RW, Berger AK, Charytan DM, Díez J, Hart RG, et al. Cardiovascular disease in chronic kidney disease. A clinical update from Kidney Disease: Improving Global Outcomes (KDIGO). *Kidney Int* 2011;80:572–86.
- Rucker D, Tonelli M. Cardiovascular risk and management in chronic kidney disease. *Nat Rev Nephrol* 2009;5:287–96.
- Muntner P, He J, Astor BC, Folsom AR, Coresh J. Traditional and nontraditional risk factors predict coronary heart disease in chronic kidney disease: results from the atherosclerosis risk in communities study. *J Am Soc Nephrol* 2005;16:529–38.
- Kendrick J, Chonchol MB. Nontraditional risk factors for cardiovascular disease in patients with chronic kidney disease. *Nat Clin Pract Nephrol* 2008;4:672–81. [CrossRef](#)
- Süleymanlar G, Utaş C, Arinsoy T, Ateş K, Altun B, Altıparmak MR, et al. A population-based survey of Chronic RENal Disease In Turkey--the CREDIT study. *Nephrol Dial Transplant* 2011;26:1862–71. [CrossRef](#)
- Brosius FC 3rd, Hostetter TH, Kelepouris E, Mitsnefes MM, Moe SM, Moore MA, et al. Detection of chronic kidney disease in patients with or at increased risk of cardiovascular disease: a science advisory from the American Heart Association Kidney And Cardiovascular Disease Council; the Councils on High Blood Pressure Research, Cardiovascular Disease in the Young, and Epidemiology and Prevention; and the Quality of Care and Outcomes Research Interdisciplinary Working Group: developed in collaboration with the National Kidney Foundation. *Circulation* 2006;114:1083–7. [CrossRef](#)
- Go AS, Chertow GM, Fan D, McCulloch CE, Hsu CY. Chronic kidney disease and the risks of death, cardiovascular events, and hospitalization. *N Engl J Med* 2004;351:1296–305.
- van der Velde M, Matsushita K, Coresh J, Astor BC, Woodward M, Levey A, et al. Lower estimated glomerular filtration rate and higher albuminuria are associated with all-cause and cardiovascular mortality. A collaborative meta-analysis of high-risk population cohorts. *Kidney Int* 2011;79:1341–52.
- Anavekar NS, McMurray JJ, Velazquez EJ, Solomon SD, Kober L, Rouleau JL, et al. Relation between renal dysfunction and cardiovascular outcomes after myocardial infarction. *N Engl J Med* 2004;351:1285–95. [CrossRef](#)
- Zakeri R, Freemantle N, Barnett V, Lipkin GW, Bonser RS, Graham TR, et al. Relation between mild renal dysfunction and outcomes after coronary artery bypass grafting. *Circulation* 2005;112(9 Suppl):I270–5.
- Hemmelgarn BR, Southern D, Cullerton BF, Mitchell LB, Knudtson ML, Ghali WA. Survival after coronary revascularization among patients with kidney disease. *Circulation* 2004;110:1890–5. [CrossRef](#)
- Dohi T, Miyauchi K, Okazaki S, Yokoyama T, Tamura H, Kojima T, et al. Long-term impact of mild chronic kidney disease in patients with acute coronary syndrome undergoing percutaneous coronary interventions. *Nephrol Dial Transplant* 2011;26:2906–11. [CrossRef](#)
- Ekici B, Tanındı A, Sayın I. The effects of glomerular filtration rate on the severity of coronary heart disease. *Turk Kardiyol Dern Ars* 2016;44:123-9.
- Uçar H, Gür M, Seker T, Sahin DY, Kalkan GY, Türkoğlu C, et al. Impaired kidney function is associated with SYNTAX score in patients with stable coronary artery disease. *Turk Kardiyol Dern Ars* 2014;42:621–8. [CrossRef](#)